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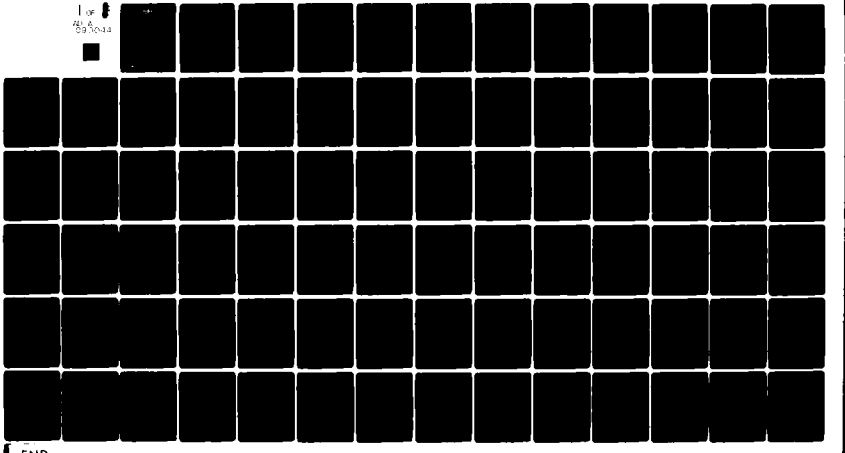

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by

Administrative Sciences Corporation
5205 Leesburg Pike - Suite 1313
Falls Church, Virginia 22041

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CONTENTS

I. INTRODUCTION

Purpose

The purpose of this report is to update (with Fiscal 1978 data) the parametric model used to estimate Naval aircraft operating and support (O&S) costs. This update, used in conjunction with the previous report[1], acts as a handbook and guide for use as a training aid for OP-96D aircraft cost analysts as well as a model capable of generating O&S estimates for Naval aircraft.

The report is divided into four sections. Section II, the Executive Summary, provides a concise summarization of the contents of the report including a discussion of the new aspects of the model. Section III contains the revised equations and data. Section IV provides examples of the use of the model using five hypothetical aircraft. In addition, these same hypothetical aircraft will be run through the Fiscal 76 and 77 editions of the model.

Again, it is important to point out that this report is intended to be an addendum to ASC R-120 Naval Aircraft Operating and Support Cost-Estimating Model - FY77 Revision and the reader should refer to that document for much of the background and detailed discussion of aircraft O&S cost estimation.

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[1]Naval Aircraft Operating and Support Cost-Estimating Model - FY77 Revision, February 1979, Contract No. N00014-77-C-0130.

II. EXECUTIVE SUMMARY

This report provides the updated equations using fiscal 1978 data for the Administrative Sciences Corporation Aircraft Operating and Support (O&S) Cost-Estimating Model. It is intended to be used as an addendum to "Naval Aircraft Operating and Support Cost-Estimating Model - FY77 Revision", ASC-R-120, February 1979, which contains an extensive discussion of each cost element as well as other background material.

Several initiatives to improve the quality and accuracy of the cost-estimating relationships were incorporated into this version of the model. The most notable is the examination of Replenishment Spares consumption over a two-year period rather than a single year. As more data becomes available, the period will be lengthened even more. Substantial work was also done in the areas of Engine Rework and Modifications.

For engines, the recently implemented Engine Analytical Maintenance Plan which has changed the Navy's engine maintenance philosophy for most engines from one of scheduled overhaul to one without scheduled overhaul was investigated. This new policy provides for engine components to be replaced/overhauled periodically but not the entire engine. Although much useful data was obtained on engine removal rates and differentiation of maintenance costs for engines utilized in different aircraft (e.g., the J52-P8 in the A-4E and the A-6E); the data does not yet reflect the new maintenance policy. Indications are that costs may shift from the Engine Rework element to the Component Rework element but the extent of this is currently unknown. The FY1979 data should be more reflective of this shift in policy.

An effort was made to investigate the consistency of the cost-estimating model over the last three years. Using five hypothetical aircraft, estimates were made using this model, the FY77 model and the FY76 model. The results are contained in Section IV and show that there is fundamental consistency over the years. Elements such as Replenishment Spares which are more variable by nature, and for which the data sources are not entirely reliable, tend to vary more than the other elements. One notable change is that the FY78 indirect factors from the NARM produce estimates for the indirect cost elements (Base Operating Support, Training Support, Medical Support, and Personnel Support) that are much lower (all other things being equal) than in previous years. This is reflective of the constrained resources available for this type of support as programmed in the FY1981 budget.

The equations in this report are summarized in Exhibit II-1.

EXHIBIT II-1

SUMMARY OF COST-ESTIMATING RELATIONSHIPS

Cost Elements	Definitions	CER	Reference
Deployed Unit Operations			
1. Aircrew (Officers)	Officer Aircrewmen	OA = O x CF x OPR	Based on program information
2. Aircrew (Enlisted)	Enlisted Aircrewmen	EA = E x CF x EPR	Based on program information
3. Combat Command Staff	Non-flying Command/Admin. Pers.	CCS = (OC x OPR) + (EC x EPR)	Based on program and squadron size information
4. Aviation POL	Fuel & Petroleum Additives for A/C	POL = (POLF x FHY)/1000; $POLF = 0.1469NTW^{0.5011} \times MS^{0.8766}$	Based on usage data from VAMOSC
5. Other Deployed Manpower	Various utility and miscellaneous personnel not previously counted	ODMC = ODM x EP; $ODM = -0.5030 + 0.2231SP^{0.5000}$	Based on OPNAV policy
6. Air TAD	Travel and TAD expenses to obtain maintenance and other training	Throughput (See Table III-3)	Based on VAMOSC data
Below Depot Maintenance			
7. Aircraft Maintenance Manpower	Squadron O&I level maintenance personnel	AMM = MO x EPR; MO = 1.6700 + 0.0180MMHMO	Based on 3-M data and OPNAV policy
8. Maintenance Material	Non-repairable O&I level maintenance material	MMC = (MMxFHY)/1000 MM = (6.9313 + 0.1028MMHMO + 0.1450MS) x 0.94	Based on VAMOSC data
9. Personnel Support Supplies	Non-maintenance O&I level material	PSS = (PSxFHY)/1000 PS = (6.9313 + 0.1028MMHMO + 0.1450MS) x 0.06	Based on VAMOSC data
Installation Support			
10. Base Operating Support	Cost of base support services to the squadron	BO = 0.0011 x TDP; BE = 0.0165 x TDP BOM = 445.0187 x TDP; BOS = (BO x OPR) + (BE x EPR) + BOM	NARM Methodology, Proxy-number of squadron pers.
Depot Maintenance			
11. Component Rework	Depot repair of repairables	CR = (CRF x FHY)/1000 CRF = 14.6847 + 6.9631MMHFH + 0.5060NTW	Based on VAMOSC data
12. Airframe Rework	Depot repair/overhaul of airframe	AR = (UAR x 12)/I UAR = -9.7977 + 5.2085MMHFH + 1.1902NTW	Based on data from Naval Air Rework Facilities
13. Engine Rework	Depot repair/overhaul of engines	$ERT = \frac{(ORR \times ERO) + ERM}{(1+ORR) \times DAR} \times EN \times FHY$ ERO = 5.5740 + 4.5270TH + 70.7100FD ERM = 8.9434 + 1.2350TH + 11.3210FD	Based on data from Naval Air Rework Facilities

EXHIBIT II-1 (cont'd.)

Cost Elements	Definitions	CER	Reference
Depot Supply			
14. Depot Supply Operations	Cost of supply depot support for A/C parts and squadron material	SDO = 0.0515DR	NARM Methodology, Proxy - all other costs
15. Technical Support	Cost of a large number of technical support programs	TS = 0.2396RS + 0.0980ACR + 0.1230ACO - SDO - SDT	NARM Methodology, Proxy - all other costs
Second Destination Transportation			
16. Second Destination Transportation	SDT costs of A/C and squadron material	SDT = 0.0379DR	NARM Methodology, Proxy - all other costs
Personnel Support and Training			
17. Individual Training	Training costs up to Readiness Squadron	TOM = 0.042DBE + 0.0520DBO + 0.1128DBT TO = 0.0643DBO + 0.0028DBT + 0.0001DBE TE = 0.1294DBE + 0.0232DBT + 0.0077DBO TT = TOM + (TO x OPR) + (TE x EPR)	NARM Methodology, Proxy - squadron and base operating enlisted, officer and total
18. Health Care	Cost of providing health care to squadron and BOS personnel	HO = 0.0038DBT; HE = 0.0060DBT HOM = 0.1853DBT; HT = (HO x OPR) + (HE x EPR) + HOM	NARM Methodology, Proxy - squadron and BOS total personnel
19. Personnel Activities	Cost of a number of personnel programs	PCS = 1.5799DBO + 0.5446DBE; REOM = 0.0630DBE; REO = 0.009DBE; REE = 0.0075DBE; OH = 0.0005DBO; EH = 0.0100DBE; TOT = 0.0624DBO; TET = 0.0451DBE; TPA = REOM + (REO + OH + TOT) x OPR + (REE + EA + TET) x EPR + PCS	NARM Methodology, Proxy - squadron and BOS officer, enlisted and total pers.
Sustaining Investments			
20. Replenishment Spares	The cost of purchasing replenishment repairable material	RS = (RSF x FHY)/1000 RSF = (3.52) x $0.0852MMHFH^{1.2234}_{MS}{}^{0.2486}$	Based on VAMOSC data - scaled to approximate budget
21. Modifications	The cost of safety mods for A/C and equipment	M = $0.0041FC_{100}$	Cost Factor or see Exhibit III-4 and III-5
22. Replenishment of Ground Support Equipment	The cost of replacing GSE	RGSF = $0.0025FC_{100}$	Cost Factor
23. Training Ordnance	The cost of all expendables used in training	Determined by A/C weaponry and training requirements	Refer to Exhibit III-6

III. FY78 COST-ESTIMATING RELATIONSHIPS

This section contains a definition of each cost element, a discussion to highlight changes since ASC R-120, a primary cost-estimating relationship (CER), a secondary cost-estimating relationship, and a brief description of the data. Costs are based on FY78 data and therefore in real FY78 dollars. Each parametric CER is described by t statistics (shown in parentheses under the appropriate coefficients), adjusted coefficients of determination ($\bar{R}^2$), the sample size (N), the F statistic and the standard error of the estimate (S.E.E.). The complete data base is also given for each parametric CER. This serves the dual purpose of providing the reader with a better understanding of what was done and gives the reader the ability to determine the relevant range of the CER by being able to examine the range of the variables in the data base. This enables the analyst to make judgement regarding the extent to which he can extrapolate.

All CER's, definitions and computed examples are for the cost of a single operating aircraft or unit of equipment (UE) operated in a squadron. To obtain the squadron cost or force cost, the analyst simply has to multiply the cost per UE by the number of operating aircraft.

1. AIRCREW (OFFICER)

1a. Definition - This is the cost of pay for officer personnel who operate the squadron aircraft. Although all pilots perform other duties in the squadron, such as maintenance supervision or squadron staff functions, their primary duty is considered to be that of aircrew and their full cost is shown in this element.

1b. Discussion - This element is handled in the same manner as the previous update except that the FY78 manpower pay rates are used. The pay factors used in the NARM and FYDP for FY78 are $24,390 for officers and $10,138 for enlisted. The Navy Composite Standard Rates (CSR) effective 1 October 1977 are shown in Exhibit III-1. The CSR for FY79 are also available and contained in Exhibit III-2.

1c. Cost-Estimating Relationship

$$OA = O \times CF \times OPR$$

where,

OA = the cost per aircraft of paying officer aircrewmen

O = the number of officers per aircrew

CF = the crew factor or the number of aircrew contained in the squadron divided by the number of operating aircraft

OPR = the FYDP average officer pay rate (FY78$K = 24.39)

Note: The variable OPR can be adjusted by the weighting factor found in the NARM for the relevant program element if so desired.

1d. Alternative CER

$$OA = \Sigma(O_i \times CSR_i)/NA$$

where,

OA = the cost per aircraft of paying officer aircrewmen

O_i = the number of officer aircrewmen in the squadron in the i^{th} pay grade

CSR_i = the composite standard rate of pay for the i^{th} pay grade

NA = the number of operating aircraft in squadron

EXHIBIT III-1
(FY78)

NAVY COMPOSITE STANDARD MILITARY RATE TABLE
(Effective 1 October 1977)

Pay Grade	Rank or Grade	Hourly Rate	Daily Rate	Monthly Rate	Annual Rate
O-10	Admiral	$26.41	$211.24	$4,577	$54,923
O-9	Vice Admiral	24.77	198.17	4,294	51,524
O-8	Rear Admiral (Upper Half)	23.49	187.91	4,071	48,857
O-7	Rear Admiral (Lower Half)	19.92	159.35	3,453	41,430
O-6	Captain	18.45	147.62	3,198	38,381
O-5	Commander	15.41	123.25	2,670	32,045
O-4	Lieutenant Commander	12.93	103.41	2,241	26,886
O-3	Lieutenant	11.38	91.03	1,972	23.667
O-2	Lieutenant Junior Grade	8.51	68.07	1,475	17,698
O-1	Ensign	6.20	49.58	1,074	12,891
W-4	Commissioned Warrant Officer	12.04	96.29	2,086	25,036
W-3	Commissioned Warrant Officer	9.59	76.29	1,662	19,939
W-2	Commissioned Warrant Officer	8.31	66.45	1,440	17,277
W-1	Warrant Officer	7.57	60.57	1,312	15,748
E-9	Master Chief Petty Officer	10.11	80.84	1,752	21,019
E-8	Senior Chief Petty Officer	8.69	69.50	1,506	18,070
E-7	Chief Petty Officer	7.53	60.20	1,304	15,652
E-6	Petty Officer First Class	6.37	50.99	1,105	13,258
E-5	Petty Officer Second Class	5.26	42.04	911	10,930
E-4	Petty Officer Third Class	4.42	35.38	767	9,199
E-3	Seaman	3.87	30.99	671	8,057
E-2	Apprentice	3.55	28.40	615	7,384
E-1	Recruit	3.18	25.47	552	6,621
	Midshipman	2.62	20.98	455	5,456

Source: NAVCOMPT Notice 7041, 13 December 1977. These rates change annually.

EXHIBIT III-2
(FY79)

NAVY COMPOSITE STANDARD MILITARY RATE TABLE
(Effective 1 October 1978)

Pay Grade	Rank or Grade	Hourly Rate	Daily Rate	Monthly Rate	Annual Rate
O-10	Admiral	25.97	207.74	4,501	54,012
O-9	Vice Admiral	25.69	205.51	4,453	53,432
O-8	Rear Admiral (Upper Half)	25.77	206.15	4,467	53,598
O-8	Rear Admiral (Lower Half)	21.65	173.17	3,752	45,025
O-6	Captain	19.64	157.09	3,404	40,844
O-5	Commander	16.37	130.95	2,837	34,047
O-4	Lieutenant Commander	13.77	110.12	2,386	28,631
O-3	Leiutenant	11.83	94.66	2,015	24,611
O-2	Lieutenant Junior Grade	8.92	71.34	1,546	18,548
O-1	Ensign	6.51	52.08	1,129	13,542
W-4	Commissioned Warrant Officer	12.44	99.53	2,156	25,877
W-3	Commissioned Warrant Officer	10.13	81.02	1,755	21,064
W-2	Commissioned Warrant Officer	8.91	71.30	1,545	18,538
W-1	Warrant Officer	7.93	63.47	1,375	16,501
E-9	Master Chief Petty Officer	10.81	86.45	1,873	22,476
E-8	Senior Chief Petty Officer	9.23	73.80	1,599	19,189
E-7	Chief Petty Officer	7.94	63.53	1,376	16,517
E-6	Petty Officer First Class	6.68	53.44	1,158	13,895
E-5	Petty Officer Second Class	5.53	44.26	959	11,507
E-4	Petty Officer Third Class	4.69	37.49	812	9,747
E-3	Seaman	4.09	32.68	708	8,497
E-2	Apprentice	3.73	29.81	646	7,750
E-1	Recruit	3.33	26.62	577	6,922
	Midshipmen	2.66	21.30	461	5,537

Source: NAVCOMPT Notice 7041, 6 December 1978.

2. AIRCREW (ENLISTED)

2a. Definition - This is the cost of paying enlisted personnel who perform as crewmembers for the aircraft.

2b. Discussion - Enlisted crewmembers are costed in this element, although they perform other duties as well.

2c. Cost-Estimating Relationship:

$$EA = E \times CF \times EPR$$

where,

EA = the cost per aircraft of paying enlisted aircrewmen

E = the number of enlisted personnel per aircrew

CF = the crew factor

EPR = the enlisted pay rate (FY78$K = 10.14)

2d. Alternative CER

$$EA = \Sigma(E_i \times CSR_i)/NA$$

where,

EA = the cost per aircraft of paying enlisted aircrewmen

E_i = the number of enlisted aircrewmen in the squadron in the i^{th} pay grade

CSR_i = the composite standard rate for the i^{th} pay grade

NA = the number of aircraft

3. COMBAT COMMAND STAFF

3a. Definition - This element represents the pay of manpower necessary for management and supervision of squadron operations.

3b. Discussion - Included in this category are:

- the Air Wing Commander and his staff allocated equally to each of the wing's aircraft deployed on the carrier,
- the squadron Administration Department[1],
- the squadron Operations Department[1],
- the squadron Executive and Executive Assistance Department[1],
- the squadron Safety Department[1],
- the squadron Photo Department (if any), and
- any other personnel whose primary function places them in this cost element.

This element is computed in the same manner as the previous update except that FY78 manpower pay rates are used. Practically speaking, the Navy usually excludes all non-squadron personnel from the direct costs of the aircraft. The analyst must determine the ground rules being used for each particular weapon system review.

3c. Cost-Estimating Relationship

$$CCS = (OC \times OPR) + (EC \times EPR)$$

where,

CCS = the cost of combat command staff manpower

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[1]Aircrew members are excluded.

OC = the number of combat command staff officers divided by the number of squadron aircraft

OPR = the officer pay rate (FY78$K = 24.39)

EC = the number of combat command staff enlisted divided by the number of squadron aircraft

EPR = the enlisted pay rate (FY78$K - 10.14)

3d. Alternative CER

$$CCS = \Sigma \frac{(OC_i \times CSR_i) + (EC_i \times CSR_i)}{NA}$$

where,

CCS = the cost of combat staff manpower

OC_i = the number of combat command staff officers in the i^{th} pay grade

CSR_i = the composite standard rate for an officer in the i^{th} pay grade

EC_i = the number of combat command staff enlisted in the i^{th} pay grade

CSR_i = the composite standard rate for an enlisted person in the i^{th} pay grade

NA = the number of aircraft in the squadron

4. AVIATION POL

4a. Definition - Aviation POL is the cost of petroleumn, oil and lubricants (including fuel additives) consumed by aircraft in flight operations and maintenance.

4b. Discussion - POL is estimated in the same manner as in previous models. The instability of the price of petroleum products necessitates that the analyst adjust the POL estimate according to the current price levels. The CER's are based on a price per gallon of $.483 for JP-5.

4c. Cost-Estimating Relationship

$$POL = \frac{POLF \times FHY}{1000}$$

$$POLF = 0.1469 NTW^{\underset{(4.26)}{0.5011}} \times MS^{\underset{(8.93)}{0.8766}}$$

$$\bar{R}^2 = 0.832$$

$$N = 15$$

$$F = 50.02$$

$$S.E.E. = 0.22$$

where,

POL = the annual cost (FY78$K) of petroleum, oil and lubricants

POLF = the cost per flying hour of POL assuming a base price of $0.483 per gallon of JP-5

FHY = the flying hours per year

NTW = the normal takeoff weight as defined by NAVAIR-53012 in OPNAV Notice C3100 (CONFIDENTIAL). This includes all fuel and weapon loads necessary for performance of the mission

MS = the maximum speed for level flight at altitude given in knots

DATA BASE

	POLF	NTW*	MS
A-4M	235.8		515
RA-5C	579.4		1,164
A-6E	424.7		563
A-7E	261.3		606
C-1A	62.3		230
C-2A	191.7		306
E-2B	166.7		320
E-2C	162.8		325
F-4J	634.6		1,280
F-4N	628.9		1,280
F-14A	497.6		1,342
RF-8G	298.2		1,174
P-3B	307.1		409
P-3C	321.0		409
S-3A	168.3		432

*Deleted for security reasons.

4d. Alternative CER

$$POL = \frac{POLF \times FHY}{1000}$$

$$POLF = -32.3566 + \underset{(2.50)}{1.642}NTW - \underset{(7.37)}{0.3853}SA$$

$\bar{R}^2 = 0.799$

$N = 17$

$F = 28.77$

$S.E.E. = 82.05$

where,

POL = the annual cost (FY78$K) of petroleum, oil and lubricants

POLF = the cost per flying hour of POL assuming a base price of $0.483 per gallon of JP-5

FHY = the flying hours per year

NTW = the normal takeoff weight as defined by NAVAIR-53012 in OPNAV Notice C3100 (CONFIDENTIAL). This includes all fuel and weapon loads necessary for performance of the mission

MS = the maximum speed for level flight at altitude given in knots

DATA BASE

	POLF	NTW*	MS
A-4M	235.8		515
RA-5C	579.4		1,164
EA-6B	421.8		538
KA-6D	458.6		563
A-6E	424.7		563
A-7E	261.3		606
C-1A	62.3		230
C-2A	191.7		306
E-2B	166.7		320
E-2C	162.8		325
F-4J	634.6		1,280
F-4N	628.9		1,280
F-14A	497.6		1,342
RF-8G	298.2		1,174
P-3B	307.1		409
P-3C	321.0		409
S-3A	168.3		432

*Deleted for security reasons.

5. OTHER DEPLOYED MANPOWER

5a. Definition - This is the cost of all squadron personnel who are of a support or administrative nature. It is essentially the remainder of the squadron personnel who are not costed in Elements 1. Aircrew (Officers), 2. Aircrew (Enlisted), 3. Combat Command Staff, or 7. Aircraft Maintenance Manpower.

5b. Discussion - Other Deployed Manpower consists primarily of the Integrated Services section of the squadron. The purpose of this section is to provide the commissarymen, food servicemen, laundrymen, stewards, supply clerks, pay clerks, medical technicians and other miscellaneous personnel to the support activities of the ship or air station to meet the incremental support requirements generated by the squadron.

5c. Cost-Estimating Relationship - Since the number of personnel required is principally determined by the total number in the squadron, this cost can be calculated with the following equation:

$$ODMC = ODM \times EPR$$

$$ODM = \underset{(26.04)}{-0.5027 + 0.2231 \times (SP)^{0.5}}$$

$$\bar{R}^2 = 0.98$$

$$N = 13$$

$$F = 678.00$$

$$S.E.E. = 2.83$$

where,

ODMC = the cost of other deployed manpower

ODM = the number of other deployed manpower per aircraft

EPR = the enlisted pay rate (FY78$K = 10.14)

SP = the total number of personnel in the squadron to be supported

SP can be computed with the following equation:

$$SP = ((O+E) \times CF + OC + EC + MO) \times NA$$

where,

O = the number of officers per aircrew (from Element 1)

E = the number of enlisted per aircrew (from Element 2)

CF = the crew factor (from Element 1)

OC = the number of combat command staff officers per aircraft (from Element 3)

EC = the number of combat command staff enlisted per aircraft (from Element 3)

MO = the number of maintenance and operating personnel per aircraft (from Element 7)

NA = the number of aircraft per squadron

DATA BASE

SP	ODM
0	0
25	4
50	10
75	14
100	18
150	27
200	33
250	38
300	43
400	49
500	54
600	59
700	64

5d. Alternative CER - If the number and grade of the authorized billets is known the following CER can be used:

$$ODMC = \Sigma(E_i \times CSR_i)/NA$$

where,

ODMC = the cost of other deployed manpower

E_i = the number of enlisted personnel in the i^{th} pay grade

CSR_i = the composite standard rate of pay for the i^{th} pay grade

NA = the number of aircraft per squadron

6. AIR TEMPORARY ADDITIONAL DUTY

6a. Definition - Air Temporary Additional Duty (TAD) is the cost of travel, lodging and incidental expenses incurred so that squadron personnel can receive training (usually maintenance related).

6b. Discussion - This cost, which is usually small, is dependent on the size of the squadron, especially the Maintenance Department, and the complexity of the aircraft. The NARM has representative costs for TAD, but they are not particularly accurate. The VAMOSC-TSS is currently the best historical source for these costs. VAMOSC gets these data annually from the Navy Cost Information System (NCIS).

6c. Cost-Estimating Relationship - Exhibit III-3 provides a representative sample of Air Tad Costs for FY1978. Estimates can be obtained by analogy using current aircraft or by scaling.

Exhibit III-3

Representative Air TAD Costs for FY78
($ in thous.)

Aircraft	TAD Costs per A/C	Aircraft	TAD Costs per A/C
A-3B	0	F-4B	0
EA-3B	29.0	F-4J	2.3
A-4E	0.3	F-4N	1.6
TA-4F	3.2	RF-8G	1.9
A-4F	0.1	F-14A	1.1
A-4M	2.3	F-5E	0.7
TA-4J	0.2	UH-1L	0
RA-5C	3.6	UH-1N	0.9
A-6A	0	SH-2D/F	2.4
EA-6B	3.0	SH-3A	0.6
KA-6D	2.1	CH-46F	0.6
A-6E	1.6	CH-53D	1.3
A-7A	0	RH-53D	11.1
A-7E	1.6	P-3B	31.6
EC-121K	0	P-3C	27.5
C-130F	34.2	US-2A/B	1.6
C-1A	3.7	S-2E	0
C-2A	6.8	S-3A	1.7
E-1B	0	T-2C	0
E-2B	3.0	T-34B	0
E-2C	4.8	OV-10A	0.5
		AV-8A	1.1

Source: VAMOSC-TSS, FY78

7. AIRCRAFT MAINTENANCE MANPOWER

7a. Definition - This element consists of the cost of all manpower necessary to support the total preventive and corrective maintenance actions performed on the aircraft and its installed systems and equipments. This includes the squadron personnel who are assigned TAD to the Aircraft Intermediate Maintenance Department.

7b. Discussion - This cost consists of the personnel in the Maintenance Department and the AIMD portion of the TAD requirements. Currently, there is no known data source which reports historical costs for this subset of the squadron contingent. The cost can be estimated, however, by identifying the appropriate personnel shown on an authorization document.

7c. Cost-Estimating Relationship - This cost can also be estimated with relative accuracy using the estimated maintainability (DDMH/FH) of the aircraft and the following equation:

$$AMM = MO \times EPR$$

$$MO = (1.670 + 0.018MMHMO)$$

$$\bar{R}^2 = 0.933$$

$$N = 11$$

$$F = 139$$

$$S.E.E. = 2.23$$

where,

AMM = the cost of aircraft maintenance manpower

MO = the number of maintenance and operating personnel required

EPR = the enlisted pay rate (FY78$K = 10.1)

MMHMO = the total maintenance manhours per month (direct maintenance manhours per flying hour (DMMH/FH) times flying hours per month (FM))

DATA BASE

Aircraft	MO	MMHMO[1]
A-4F	10.77	462
RA-6C	37.35	1,911
A-6A	19.98	1,084
A-7E	16.06	734
E-1B	12.25	512
E-2B	27.50	1,339
F-4J	18.88	1,981
F-8J	13.14	780
S-2E	11.43	346
P-3B	16.77	994
C-1A	7.32	468

It should be noted that the MO data previously quoted is taken from OPNAVINST C6311.3b which is dated April 12, 1971 and is obviously outdated. In fact, the concept of the MO factor is one which is no longer officially used in the Navy. However, the concept remains the same and each Navy squadron has a specific number of personnel concerned with the maintenance and operation of the aircraft whether they are referred to in terms of an MO factor or otherwise. This factor could have been updated, but was not, for two reasons. First, it would have been too time consuming for the scope of this work; and secondly, the current equation has proved accurate in a number of recent analyses and is believed to still be valid. Perhaps, at a later time, when the resources are available, this equation can be reconfirmed or revised.

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[1]Based on FY76 data.

8. MAINTENANCE MATERIAL

8a. Definition - This is the cost of all consumable maintenance supplies, whether acquired by the Navy Stock Fund (NSF) or any other method of funded purchase. The costs are incurred at both the organizational and intermediate levels.

8b. Discussion - This element was determined from data received from OP-51C.

8c. Cost-Estimating Relationship

$$MMC = \frac{MM \times FHY}{1000}$$

$$MM = (6.9313 + \underset{(3.413)}{0.1028MMHMO} + \underset{(3.841)}{0.1450MS}) \times 0.94$$

$$R^2 = 0.66$$

$$N = 15$$

$$F = 14.82$$

$$S.E.E. = 59.18114$$

where,

MMC = the annual cost (FY78$K) of maintenance material

MM = the cost per flying hour (FY78$) of maintenance material

FHY = the flying hours per year

MS = the maximum speed for level flight at altitude given in knots

MMHMO = the total maintenance manhours per month (direct maintenance manhours per flying hour (DMMH/FH) times flying hours per month (FM))

Note: The CER for MM is based on aggregate data which also contains the cost of Personnel Support Supplies (Element 9). Based on the data received from OP-51C, MM comprises 94% of the total and PSS 6%.

DATA BASE

	MM + PSS	MMHMO	MS
A-4F	108.2	244	515
A-6E	276.1	1,125	563
A-7E	135.5	1,103	606
E-2C	162.7	1,262	320
F-14A	406.9	1,212	1,342
F-4N	255.8	875	1,280
P-3C	165.4	1,216	409
RA-5C	418.9	2,555	1,164
S-3A	236.7	1,105	440
C-2A	201.1	1,023	306
RF-8G	312.8	1,260	1,175
KA-6D	175.1	1,205	563
EA-6B	384.1	2,107	538
F-4J	299.1	1,183	1,491
C-130F	141.5	1,715	333

9. PERSONNEL SUPPORT SUPPLIES

9a. Definition - This is the cost of all non-maintenance items used by the squadron for aircraft operations. It relates primarily to the health, safety and welfare of the aircrew.

9b. Discussion - This element is 6% of the total cost of Operating Consumables (Maintenance Material + Personnel Support Supplies). The CER in Element 8 is therefore multiplied by .06 versus .94 (see note concerning Element 8 CER).

9c. Cost-Estimating Relationship

$$PSS = \frac{PS \times FHY}{1000}$$

$$PS = (6.93134 + \underset{(3.413)}{0.1028MMHMO} + \underset{(3.841)}{0.14497MS}) \times 0.06$$

$$\bar{R}^2 = 0.66$$

$$N = 15$$

$$F = 14.82$$

$$S.E.E. = 59.18114$$

where,

PSS = the annual cost (FY78$K) of personnel support supplies

PS = the cost per flying hour (FY78$) of personnel support supplies

FHY = the flying hours per year

MS = the maximum speed for level flight at altitude given in knots

MMHMO = the total maintenance manhours per month (direct maintenance manhours per flying hour (DMMH/FH) times flying hours per month (FM))

DATA BASE

Aircraft	MM+PSS	MMHMO	MS
A-4F	108.2	244	515
A-6E	276.1	1,145	563
A-7E	135.5	1,103	606
E-2C	162.7	1,262	320
F-14A	406.9	1,212	1,342
F-4N	255.8	875	1,280
P-3C	165.4	1,216	409
RA-6C	418.9	2,555	1,164
S-3A	236.7	1,105	440
TA-4J	71.3	498	586
T-28B	29.8	1,234	304
C-2A	201.1	1,023	306
RF-8G	312.8	1,260	1,175
KA-6D	175.1	1,205	563
EA-6D	384.1	2,107	538
F-4J	299.1	1,183	1,491
C-130F	141.5	1,715	333

10. BASE OPERATING SUPPORT

10a. Definition - This is the cost of base manpower and the operating funds necessary to provide the base services which support the squadron.

10b. Discussion - Included in this element are those personnel who are assigned to the base (not the squadron) and work in the laundry, mess, supply room and other areas. It also includes the base personnel who are permanently assigned to the AIMD of the air station. Since it is often difficult to determine the variable impacts on base operating support costs of the addition or deletion of a force unit such as an aircraft, the methodology used in the Navy Resource Model (NARM) Program Factors Manual was adopted to provide an estimate for Base Operating Support (BOS) costs as well as several other elements which are similarly indirect in nature. Please refer to ASC R-120 for a complete discussion of this methodology.

10c. Cost-Estimating Relationship - The computation for Base Operating Support using the NARM factors is as follows:

$$BO = 0.0011 \times TDP$$

$$BE = 0.0165 \times TDP$$

$$BOM = 445.0187 \times TDP$$

$$BOS = (BO \times OPR) + (BE \times EPR) + BOM$$

where,

BO = the number of base operating officers necessary to provide support to the aircraft system

TDP = the number of total direct personnel (officers and enlisted) involved in operating and supporting the aircraft system. This is the sum of the personnel identified in Element 1 - Aircrew, Officer; Element 2 - Aircrew, Enlisted; Element 3 - Combat Command Staff; Element 5 - Other Deployed Manpower; and Element 7 - Aircraft Maintenance Manpower

BE = The number of base operating enlisted personnel required to support the aircraft system

BOM = the O&M funds necessary to support the aircraft system

BOS = the total cost (O&MN and MPN) of base operating support services

OPR = the officers pay rate (FY78$K = 24.39)

EPR = the enlisted pay rate (FY78$K = 10.14)

It is important to make note of three variables - the number of direct enlisted (E x CF) + EC + ODM + MO plus base operating enlisted (BE), hereafter referred to as direct plus base operating enlisted (DBE); the number of direct officers (O x CF) + OC plus base operating officers (BO), hereafter referred to as direct plus base operating officers (DBO); and the total of the two, hereafter referred to as direct plus base operating total (DBT). These variables are required by the NARM methodology and are used to compute costs for Elements 17 - Individual Training, 18 - Health Care, and 19 - Personnel Support.

The equations are given below:

$$DBE = (E \times CF) + EC + ODM + MO + BE$$

$$DBO = (O \times CF) + OC + BO$$

$$DBT = DBE + DBO$$

where,

DBE = the total number of enlisted personnel, direct plus base operating, required to operate and provide base support to the aircraft system

E = the number of enlisted personnel per aircrew

CR = the crew factor

EC = the number of combat command staff enlisted divided by the number of squadron aircraft

ODM = the number of other deployed manpower per aircraft

MO = the number of maintenance and operating personnel required

BE = the number of base operating enlisted personnel required to support the aircraft system

DBO = the total number of officer personnel, direct plus base operating, required to operate and provide base support to the aircraft system

O = the number of officers per aircrew

OC = the number of combat command staff officers divided by the number of squadron aircraft

BO = the number of base operating officers necessary to provide support to the aircraft system

DBT = the total number of personnel, direct plus base operating support, required to operate and provide base support to the aircraft system

11. COMPONENT REWORK

11a. Definition - This is the cost of reworking or repairing components of the aircraft and its associated support equipment. This maintenance, which generally involves greater technical capability and more extensive facilities than are available at base level, is usually performed at the Naval Air Rework Facilities (NARF) but can also be done by another service or by a contractor. When the work is done by another service or a contractor, the cost is usually shown as a fixed price amount. When it is done by the NARF, it consists of labor, material and overhead.

11b. Discussion - Since the Navy manages its supply system, including the repair of repairable items, on an item basis, it is difficult to obtain visibility of costsrelating to a particular type/model/series aircraft. Despite this difficulty and problems concerned with the accuracy of the data, the VAMOSC system is perhaps the only source which is based on fleet experience, and is therefore the best available data which is easily obtainable.

11c. Cost-Estimating Relationship

$$CR = \frac{CRF \times FHY}{1000}$$

$$CRF = 14.6847 + \underset{(5.802)}{6.9631MMHFH} + \underset{(2.432)}{0.5060NTW}$$

$$\bar{R}^2 = 0.689$$

$$N = 17$$

$$F = 18.741$$

$$S.E.E. = 79.775$$

where,

CR = the annual cost of component rework (FY78$K)

CRF = the cost per flying hour of component rework (FY78$K)

FHY = the flying hours per year

MMHFH = the number of direct maintenance manhours per flying hour as defined by the 3-M System

NTW = the normal take-off weight as defined by NAVAIR-53012 in OPNAV Notice C3100 (CONFIDENTIAL). This includes all fuel and weapon loads necessary for performance of the mission.

DATA BASE

Aircraft	CRF (FY78$)	MMHFH (From VAMOSC)	NTW*
A-4M	100.9	17.9	
RA-5C	572.7	80.9	
EA-6B	333.3	57.6	
KA-6D	344.6	44.2	
A-6E	345.5	40.2	
A-7E	178.0	27.8	
C-1A	67.4	16.6	
C-2A	242.9	30.3	
E-2B	423.3	42.8	
E-2C	374.8	29.7	
F-4J	312.5	47.9	
F-4N	388.7	42.3	
F-14A	593.9	56.6	
RF-8G	213.5	37.5	
P-3B	275.5	21.9	
P-3C	250.9	20.3	
S-3A	433.4	32.6	

*Deleted for security reasons.

11d. Alternative CER

$$CR = \frac{CRF \times FHY}{1000}$$

$$CRF = 32.20965 + \underset{(6.18)}{7.668}MMHFH + \underset{(1.08)}{49.666}AD$$

$$\bar{R}^2 = 0.76$$

$$N = 13$$

$$F = 21.79$$

$$S.E.E. = 80.37$$

where,

CR = the annual cost of component rework (FY78$K)

CRF = the cost per flying hour of component rework

FHY = the flying hours per year

MMHFH = the number of direct maintenance manhours per flying hour as defined and reported by the 3-M System

AD = a dummy variable

AD = 1 for each early warning (E), patrol (P), reconnaisance(R), or ASW (S) aircraft

AD = 0, otherwise

DATA BASE

Aircraft	CRF (FY78$K)	MMHFH (from VAMOSC)	AD
A-4F	136.6	17.48	0
A-6E	345.5	39.28	0
A-7E	178.0	27.08	0
C-2A	242.9	27.18	0
E-2C	374.8	28.63	1
F-14A	593.9	54.73	0
F-4N	388.7	43.30	0
KA-6D	344.6	41.10	0
P-3C	250.9	19.87	1
RA-5C	572.7	80.01	1
RF-8G	213.5	28.04	1
S-3A	433.4	30.71	1
TA-4J	121.1	14.83	0
T-28B	35.8	8.47	0

12. AIRFRAME REWORK

12a. Definition - This is the cost, including labor, material and overhead, of making periodic inspections, repairs and overhaul of the airframe to assure its material condition.

12b. Discussion - Data concerning the depot repair of airframes is published quarterly in the Industrial Performance Summary of the Naval Air Rework Facilities by Code 2121B of the Naval Aviation Logistics Center (NALC), Patuxent River, Maryland. This is the source used in this model. For a more complete discussion of data sources refer to ASC R-120.

12c. Cost-Estimating Relationship

$$AR = \frac{UAR \times 12}{I}$$

$$UAR = -9.7977 + \underset{(5.64)}{5.2085MMHFH} + \underset{(2.34)}{1.1902NTW}$$

$$\bar{R}^2 = 0.717$$

$$N = 15$$

$$F = 18.71$$

$$S.E.E. = 61.43$$

where,

AR = the annualized cost of an airframe rework (FY78$K)

UAR = the unit cost of an airframe rework (FY78$K)

I = the airframe rework interval in months

MMHFH = the number of direct maintenance manhours per flying hour as defined by the 3-M System

NTW = the normal take-off weight as defined by NAVAIR 53012 in OPNAV Notice C3100 (CONFIDENTIAL). This includes all fuel and weapon loads necessary for performance of the mission

DATA BASE

Aircraft	UAR (FY78$K)	MMHFH	NTW*
A-4M	96.9	17.9	
RA-5C	512.3	80.9	
EA-6B	260.2	57.6	
KA-6D	264.3	44.2	
A-6E	260.9	40.2	
A-7E	105.9	27.8	
C-1A	91.0	16.6	
C-2A	265.1	30.3	
E-2C	307.5	29.7	
F-4J	249.3	47.9	
F-4N	274.4	42.3	
F-14A	457.1	56.6	
P-3B	277.7	21.9	
P-3C	215.0	20.3	
S-3A	248.5	32.6	

*Deleted for security reasons.

12d. Alternative CER

$$AR = \frac{UAR \times 12}{I}$$

$$UAR = 4.4437 + \underset{(3.30)}{0.1287}MMHMO + \underset{(2.47)}{0.1341}MS$$

$$\bar{R}^2 = 0.614$$

$$N = 14$$

$$F = 11.34$$

$$S.E.E. = 74.41$$

where,

AR = the annualized cost of an airframe rework (FY78$K)

UAR = the unit cost of an airframe rework (FY78$K)

I = the airframe rework interval in months

MMHMO = the total maintenance manhours per month (direct maintenance manhours per flying hr (DMMH/FH) times the flying hours per month (FM))

MS = the maximum speed for level flight at altitudes given in knots

DATA BASE

Aircraft	UAR (FY78$K)	MMHMO	MS (Knots)
A-4M	96.9	435	515
RA-5C	512.3	2,556	1,164
FA-6B	260.2	2,179	538
KA-6D	264.3	1,205	563
A-6E	260.9	1,159	563
A-7E	105.9	1,120	606
C-1A	91.0	569	230
E-2C	307.5	1,237	325
F-4J	249.3	1,202	1,280
F-4N	274.4	895	1,280
F-14A	457.1	1,256	1,342
P-3B	277.7	1,417	409
P-3C	215.0	1,245	409
S-3A	248.5	1,118	432

13. ENGINE REWORK

13a. Definition - This is the cost of repairing and overhauling aircraft engines at the Naval Air Rework Facilities or similar facilities of other services or contractors.

13b. Discussion - There has been no change in the approach to estimating this cost. Refer to ASC R-120 for details.

13c. Cost-Estimating Relationship

$$ERT = \left(\frac{(ORR \times ERO) + ERM}{(1 + ORR) \times DAR}\right) \times EN \times FHY$$

$$ERO = \underset{}{5.5740} + \underset{(2.39)}{4.5270TH} + \underset{(4.56)}{70.7100FD}$$

$\bar{R}^2 = 0.81$

$N = 8$

$F = 15.98$

$S.E.E. = 20.81$

$$ERM = \underset{}{8.9434} + \underset{(3.78)}{1.2350TH} + \underset{(4.25)}{11.3210FD}$$

$\bar{R}^2 = 0.84$

$N = 7$

$F = 20.06$

$S.E.E. = 3.58$

where,

ERT = the total cost of engine rework (FY78$K)

ORR = the overhaul/repair ratio, i.e., the number of a certain type engine overhauled in a year divided by the number repaired in a year

ERO = the unit cost of overhauling an engine at the depot (FY78$K)

DAR = the depot arrival rate in operating hours, i.e., the total operating hours accumulated by the engines divided by the number of engines requiring depot repair

ERM = the unit cost of repairing an engine at the depot (FY78$K)

EN = the number of engines mounted on the aircraft

FHY = the flying hours per year

TH = engine thrust in thousands of pounds

FD = a dummy variable such that

FD = 1 if the engine is a fan

FD = 0 otherwise

DATA BASE
(Engine Overhaul)

Engine	ERO (FY78$K)	TH (Thous. of lbs.)	FD
J52-P408	60.2	11.2	0
J52-P8	50.6	9.3	0
J57-P10	78.3	10.5	0
J79-GE10	67.0	17.9	0
J79-GE8	70.1	17.0	0
TF30-P412A	191.2	20.0	1
TF34-GE400	100.0	9.3	1
TF41-A2	138.2	15.0	1

DATA BASE
(Engine Repair)

Engine	ERM (FY78$K)	TH (Thous. of lbs.)	FD
J52-P8B	20.6	9.3	0
F52-P408	21.6	11.2	0
J79-GE8	33.7	17.0	0
J79-GE10	32.3	17.9	0
J57-P10	17.9	10.5	0
TF30-P412A	43.5	20.0	1
TF34-GE400	36.2	9.3	1
TF41-A2	35.8	15.0	1

13d. Alternative CER

$$ERT = \left(\frac{(ORR \times ERO) + ERM}{(1+ORR) \times DAR}\right) \times EN \times FHY$$

$$ERO = -40.0501 + \underset{(2.41)}{7.9885}TH + \underset{(3.03)}{87.8600}FD$$

$\bar{R}^2 = 0.726$

$N = 9$

$F = 11.50$

$S.E.E. = 40.33$

$$ERM = -43.3620 + \underset{(3.83)}{2.4004}ED - \underset{(-2.10)}{26.193}MED$$

$\bar{R}^2 = 0.694$

$N = 9$

$F = 10.07$

$S.E.E. = 17.64$

where,

ERT = the total cost of engine rework (FY78$K)

ORR = the overhaul/repair ratio, i.e., the number of a certain type engine overhauled in a year divided by the number repaired in a year

ERO = the unit cost of overhauling an engine at the depot (FY78$K)

DAR = the depot arrival rate in operating hours, i.e., the total operating hours accumulated by the engines divided by the number of engines requiring depot repair

ERM = the unit cost of repairing an engine at the depot (FY78$K)

EN = the number of engines mounted on the aircraft

FHY = the flying hours per year

TH = engine thrust in thousands of pounds

FD = a dummy variable such that

FD = 1 if the engine is a fan

FD = 0 otherwise

ED = the diameter of the engine measured in inches

MED = multi-engine dummy such that:

MED = 0 if the aircraft has only one engine

MED = 1 if the aircraft has more than one engine

14. DEPOT SUPPLY OPERATIONS

14a. Definition - This is the cost of manpower and material needed to buy, store, package, manage and control supplies, spares and repair parts used in operating and maintaining aircraft, aircraft components and support equipment. When a new aircraft is introduced into the force, spare parts are procured to sustain operations. These parts are introduced into the supply system and resources are expended to manage, store, distribute, package and crate both the spares inventory and other common supply items which support aircraft system personnel.

14b. Discussion - This cost is computed from the Navy Resource Model Program Factors Manual by taking the costs contained in program element 71111N - Supply Depot Operations of the budget and allocating to force units on the basis of direct requirements of manpower and operating funds, i.e., MPN, O&MN, and APN.

14c. Cost-Estimating Relationship - The equation for estimating the cost of depot supply operations is:

$$SDO = 0.0515DR$$

where,

SDO = the annual cost of depot supply operations required to support a weapon system (FY78$K)

DR = the direct requirements of manpower and operating funds represented by the total cost of Elements 1-5, 7-9, 11-13 (FY78$K)

15. TECHNICAL SUPPORT

15a. Definition - This is the cost of a number of programs, usually managed centrally, which support aircraft operations. A partial list of these programs is given below:

- Contractor Engineering Technical Services (CETS)
- Navy Engineering Technical Services (NETS)
- Depot Rework of Ground Support Equipment (GSE)
- Installation and Calibration of GSE
- Depot Rework of Catapult and Arresting Gear
- Technical Publications Updates
- NAVAIRSYSCOM Representatives

15b. Discussion - Since these activities support many weapon systems, it is advantageous to use the methodology in the Navy Resource Model Program Factors Manual to estimate this cost. The NARM methodology includes both Depot Supply Operations (Element 14) and Second Destination Transportation (Element 16) in the computation of Technical Support. These costs must be subtracted.

15c. Cost-Estimating Relationship

$$TS = 0.2396RS + 0.0980ACR + 0.1230ACO - SDO - SDT$$

$$ACR = CR + AR + ERT$$

$$ACO = POL + MMC + PSS$$

where,

TS = the annual cost of technical support (FY78$K)

RS = the annual cost of Replenishment Spares - Element 20 (FY78$K)

ACR = the annual cost of aircraft rework, which is the sum of Component Rework - Element 11, Airframe Rework - Element 12, and Engine Rework - Element 13 (FY78$K)

ACO = the annual cost of aircraft operations, which is the sum of Aviation POL - Element 4, Maintenance Material - Element 8, and Personnel Support Supplies - Element 9.

SDO = the annual cost of supply depot operations required to support a weapon system (FY78$K)

SDT = the annual cost of second destination transportation (FY78$K)

16. SECOND DESTINATION TRANSPORTATION

16a. Definition - This is the cost of shipping material needed to support the aircraft unit. Material includes: (1) spare and repair parts that are shipped between the centralized repair depots and the aircraft unit; and (2) support items that are needed by aircraft unit personnel, such as food and administrative supplies.

16b. Discussion - The NARM Program Factors Manual estimates second destination transportation by allocating the costs contained in program element 78010N - Second Destination Transportation, on the basis of direct requirements of operating funds.

16c. Cost-Estimating Relationship

$$SDT = 0.0379DR$$

where

SDT = the annual cost of second destination transportation (FY78$K)

DR = the direct requirements of manpower and operating funds represented by the total cost of Elements 1-5, 7-9, 11-13 (FY78$K)

17. INDIVIDUAL TRAINING

17a. Definition - This is the cost of paying personnel in training who will replace unit personnel, the training staff and training operating funds. This includes all training from recruit training through undergraduate pilot and navigator training, as well as the operation and maintenance of trainers and simulators by the Fleet Aviation Specialized Operational Training Detachments (FASOTRADET's) and the Naval Air Maintenance Training Detachments (NAMTRADET's). This element does not include any aspect of readiness training, which is costed as a separate squadron.

17b. Discussion - The NARM computes this cost by summing all of the costs of the students and two-thirds the cost of staff personnel and operating funds for the program elements shown below and allocating to the aircraft on the basis of personnel.

24633N	Fleet Support Training
84711N	Recruit Training Units
84722N	Officer Candidate Schools
84731N	General Skill Training
84751N	Professional Military Education
84752N	Other Professional Education
85796N	Base Operations, Training
86723N	Other Health Acq. Programs
86761N	Education & Training, Health Care
89731N	Training Support to Units

17c. Cost-Estimating Relationship

$$TOM = 0.0042\ DBE + 0.0520\ DBO + 0.1128\ DBT$$

$$TO = 0.0643\ DBO + 0.0028\ DBT + 0.0001\ DBE$$

$$TE = 0.1294(DBE) + 0.0232(DBT) + 0.0077(DBO)$$

$$TT = TOM + (TO \times OPR) + (TE \times EPR)$$

where,

TOM = training O&M funds

DBE = the number of squadron enlisted personnel (from Elements 2,3,5 and 7) and base operating enlisted (from Element 10) as defined in Section 10c.

DBT = the number of squadron enlisted personnel and officers and base operating enlisted and officers as defined in Section 10c.

TO = the number of officer staff required for training duties

DBO = the number of squadron officers and base operating officers as defined in Section 10c.

TE = the number of enlisted personnel required for training duties

TT = total annual cost of individual training

OPR = officer pay rate (FY78$K) = 24.39

EPR = enlisted pay rate (FY78$K) = 10.14

18. HEALTH CARE

18a. Definition - Health care is the cost of medical personnel and materials needed to provide medical support to aircraft unit personnel and to base personnel who provide direct support to the aircraft.

18b. Discussion - The NARM estimates this cost by summing two-thirds (2/3) of the cost of medical operations. The program elements are:

81211N Hospitals
87711N Care in Defense Facilities
87714N Other Health Activities
81213N Patients

18c. Cost-Estimating Relationship

$$HO = 0.0038DBT$$

$$HE = 0.0060DBT$$

$$HOM = 0.1853DBT$$

$$HT = (HO \times OPR) + (HE \times EPR) + HOM$$

where,

HO = the number of health care officers necessary to support the weapon system

DBT = the number of squadron enlisted personnel and officers (from Elements 1,2,3,5, and 7) and base operating enlisted and officers (from Element 10)

HE = the number of health care enlisted personnel

HOM = health care O&M funds (FY78$K)

DBO = the number of squadron officers and base operating officers

DBE = the number of squadron enlisted personnel (from Elements 2,3,5, and 7) and base operating enlisted (from Element 10) as defined in Section 10c.

HT = the total cost of health care

OPR = officer pay rate (FY78$K = 24.39)

EPR = enlisted pay rate (FY78$K) = 10.14)

19. PERSONNEL SUPPORT

19a. Definition - Personnel support is comprised of two parts. The first part consists of the costs incident to the permanent change of station (PCS) of squadron and base operating personnel, either individually or as an organized unit. The second portion is the cost of recruiting and examining activities, the cost of transient personnel, and the cost of prisoners.

19b. Discussion - PCS rates are figured in the Navy Resource Model Program Factors Manual by dividing the total PCS cost by the number of personnel, producing an annual PCS cost per person (officer; enlisted). This is applied to the number of personnel operating and supporting the system to obtain an estimate. The other costs, recruiting and examining, transients and prisoners, are estimated by the NARM by summing two-thirds (2/3) of the cost of recruiting and examining activities and all of the costs associated with transients and prisoners and allocating these costs to the weapon system on the basis of the number of personnel. The program elements are given below:

81711N	Recruiting Activities
81713N	Recruiting Activities
88732	Transients
8872IN	Personnel Holding Account
88731N	Permanent Change of Station

19c. Cost-Estimating Relationship

$$PCS = 1.3799DBO + 0.5446DBE$$
$$REOM = 0.0630DBE$$
$$REO = 0.0009DBE$$
$$REE = 0.0075DBE$$

OH = 0.0005DBO

EH = 0.0100DBE

TOT = 0.0624DBO

TET = 0.0451DBE

TPA = REOM + (REO + OH + TOT) x OPR + (REE + EH + TET) x EPR + PCS

where,

PCS = the annual cost (MPN funds) of PCS for weapon system direct and base operating personnel (FY78$K)

DBO = the number of squadron officers and base operating officers as defined in Section 10c.

DBE = the number of squadron enlisted personnel (from Elements 2,3,5, and 7) and base operating enlisted (from Element 10) as defined in Section 10c.

REOM = recruiting and examining O&M funds (FY78$K)

REO = the number of recruiting and examining officers necessary to support the weapon system

REE = the number of recruiting and examining enlisted necessary to support the weapon system

EH = the number of enlisted personnel in the holding account

OH = the number of officer personnel in the holding account

TOT = the number of officers in transit

DBT = the number of squadron enlisted personnel and officers and base operating enlisted and officers as defined in Section 10c.

TET = the number of enlisted personnel in transit

TPA = the total cost of personnel support (FY78$K)

OPR = officer pay rate (FY78$K = 24.39)

EPR = enlisted pay rate (FY78$K = 10.14)

20. REPLENISHMENT SPARES

20a. Definition - This is the cost of procuring aircraft assemblies, spares and repair parts which are normally repaired and returned to stock. In addition, it includes procurement of stock levels that are not provided by Initial Spares procurement.

20b. Discussion - ASC R-120 contains a detailed discussion of Replenishment Spares Cost,if more information is needed. Because of the nature of Replenishment Spares, it was felt that a better, more accurate CER could be developed if more than one year of data were used in the data base. For the CER's in 20c. and d. FY77 VAMOSC (adjusted to FY78$) and FY78 data were combined. A three or four year average would probably be even better and will be done in subsequent years.

As discussed in ASC R-120, the VAMOSC methodology results in a rather substantial shortfall when compared to the actual Replenishment Spares funding for the year. The CER's are multiplied by a factor to correct for this shortfall.

	Replenishment Spares Total Costs (78$M)		
	77	78	Total
VAMOSC	34.3	64.4	101.1
R. Spares Budget Tot.	154.7	190.6	355.8
Correction Factor			3.52

20c. Cost-Estimating Relationship

$$RS = \frac{RSF \times FHY}{1000}$$

$$RSF = (3.52) \times 0.0852 \; MMHFH^{\underset{(5.33)}{1.2234}} \; MS^{\underset{(1.42)}{0.2486}}$$

$\bar{R}^2$ = 0.775

N = 17

F = 34.41

S.E.E. = 0.31

where,

RS = the annual cost of procuring APN-6 Replenishment Spares to support the aircraft system (FY78$K)

RSF = the cost per flying hour of procuring APN-6 Replenishment Spares to support the aircraft system (FY78$K)

FHY = the flying hours per year

MMHFH = the number of direct maintenance manhours per flying hour as defined by the 3-M system

MS = the maximum speed for level flight at altitude given in knots

DATA BASE

Aircraft	RSF (Avg. 77&78) (FY78$)	MMHFH	MS
A-4M	14.4	17.9	515
RA-5C	114.7	80.9	1,164
EA-6B	50.5	57.6	538
KA-6D	33.7	44.2	563
A-6E	24.5	40.2	563
A-7E	19.6	27.8	606
C-1A	7.5	16.6	230
C-2A	23.1*	30.3	306
E-2B	39.0	42.8	320
E-2C	33.8	29.7	325
F-4J	34.4	47.9	1,280

*FY78 value only

DATA BASE (cont'd.)

Aircraft	RSF (Avg. 77&78) (FY78$)	MMHFH	MS
F-4N	53.5	42.3	1,280
F-14A	112.0	56.6	1,342
RF-8G	46.7	37.5	1,174
P-3B	25.6	21.9	409
P-3C	13.7	20.3	409
S-3A	34.5	32.6	432

20d. Alternative CER

$$RS = \frac{RSF \times FHY}{1000}$$

$$RFS = 3.52\ (-29.6261 + \underset{(3.87)}{1.3628}MMHFH + \underset{(1.80)}{0.0336}MS)$$

$$\bar{R}^2 = 0.83$$

$$N = 11$$

$$F = 25.64$$

$$S.E.E. = 14.67$$

where,

RS = the annual cost of procuring APN-6 Replenishment Spares to support the aircraft system (FY78$K)

RSF = the cost per flying hour of procuring APN-6 Replenishment Spares to support the aircraft system (FY78$K)

FHY = the flying hours per year

MMHFH = the number of direct maintenance manhours per flying hour as defined by the 3-M system

MS = the maximum speed for level flight at altitude given in knots

DATA BASE

Aircraft	RSF (Avg. 77&78) (FY78$)	MMHFH	MS
A-4F	14.6	17.5	515
A-6E	24.5	40.2	563
A-7E	19.6	27.8	606
E-2C	33.8	29.7	326
F-14A	112.0	56.6	1,342
F-4N	53.5	42.3	1,280
KA-6D	33.7	44.2	563
P-3C	13.7	20.3	409
RA-56	114.7	80.9	1,164
RF-8G	46.7	37.5	1,174
S-3A	34.5	32.6	432

21. MODIFICATIONS

21a. Definition - The cost of modifying aircraft, ground equipment, and training equipment to enable them to perform mission essential tasks (not new capability), and to improve reliability or reduce maintenance cost. This includes the cost of purchasing the modifications, including the requisite engineering plus the cost of depot installation. There are no installation costs incurred at the organizational and intermediate levels since those personnel are dedicated to the support of the aircraft and the cost of their time is included in the other cost elements.

21b. Discussion - The reader should refer to ASC R-120 for a complete discussion of modification of aircraft. Exhibit III-4 contains updated modification data from the FY80 budget back-up submitted to Congress. It provides total requested authorization for aircraft modifications as well as the O&MN to install the modifications. Exhibit III-5 contains both FY77 and 78 modification costs from VAMOSC. The VAMOSC data is based on a judgment of each modification to determine whether it is new capability or an O&S motivated modification. The FY78 VAMOSC total is less than half of the FY77 VAMOSC total and less than 16% of the budget total. Discussion with NAVAIR indicates that this figure should approximate 75%; therefore, this is an area that should be examined further.

21c. Cost-Estimating Relationship - The analyst can use the data in Exhibits III-4 and III-5 for analogs or can use the following relationship in which modification costs have been related to the flyaway costs.

$$M = 0.0041FC_{100}$$

where,

M = the annual cost of modifications (FY78$K)

FC_{100} = the cumulative average flyaway cost of the first 100 production aircraft (FY78$K)

EXHIBIT III-4

Modification Costs
(FY78$M)

	77 Est.	78 Est.	79 Est.	80 Est.	81 Est.
APN-5 Modification of A/C	597.3	824.9	803.6	589.5	585.6
O&M Installation of Mod.	41.8	82.5	84.0	81.0	
APN Modification of A/C by Type/Model	79	80	81	82	
A-3	6.1	5.1	--	--	
A-4	17.2	12.7	2.4	23.6	
A-6	119.2	62.2	122.6	115.1	
EA-6	8.7	21.9	36.5	54.6	
A-7	49.3	57.7	49.7	45.5	
AV-8	13.8	14.5	17.2	11.5	
F-4	86.7	65.3	40.4	27.6	
RF-4	29.2	1.3	2.5	5.5	
F-5	0.3	0.3	0.6	0.7	
F-8	1.6	1.7	1.6	--	
F-14	25.6	14.5	30.8	88.0	
F-18	--	--	--	0.9	
OV-10	3.0	--	0.6	--	
H-46	119.6	92.8	73.6	29.7	
H-53	45.5	32.3	4.8	7.0	
H-1	14.4	27.3	4.0	0.6	
H-2	11.3	10.3	9.2	3.8	
H-3	43.8	10.8	0.7	1.4	
EP-3	2.5	--	5.9	4.8	
P-3	75.2	49.8	66.6	78.7	
S-3	27.3	26.1	19.8	15.9	
E-2	17.3	19.5	20.0	11.7	
TC-4	7.6	--	--	--	
C-2	1.0	2.0	0.1	--	
C-130	14.8	15.0	10.7	8.0	
EC-130	22.4	17.1	28.6	14.6	
C-135	5.9	0.3	8.7	5.7	

EXHIBIT III-4

Modification Costs (cont'd.)
(FY78$M)

	79	80	81	82
Various Modifications	--	1.7	2.8	--
Power Plant Changes	7.6	7.0	5.8	7.2
Miscellaneous Flight Safety	4.3	0.9	0.7	0.9
Common Avionics	0.2	0.9	0.7	0.9
Common ECM	15.7	16.8	17.0	15.9
Total Mods.	803.6	589.5	585.6	580.5

EXHIBIT III-5

Representative Modification Costs from VAMOSC
(then year $ in thous.)

Aircraft	Modification Costs Per A/C		Aircraft	Modification Costs Per A/C	
	77	78		77	78
A-3B	0	0	F-4B	18.8	24.6
EA-3G	0.4	0	F-4J	138.7	10.4
A-4E	6.3	0.8	F-4N	9.6	0
TA-4F	5.6	0	RS-8G	43.2	123.2
A-4F	6.1	0.1	F-14A	161.1	95.4
A-4M	116.9	16.3	F-5E	0	11.7
TA-4J	5.5	0	UH-1L	0.6	0
RA-5C	54.4	0	UH-1N	13.0	12.7
A-6A	1,132.7	0	SH2D/F	13.4	41.1
EA-6B	411.0	51.4	SH-3A	76.1	0
KA-6D	29.7	15.5	CH-46F	40.2	29.1
A-6E	65.4	25.1	CH-53D	122.4	2.3
A-7A	3.9	0.1	RH-53D	44.3	83.6
A-7E	59.9	23.3	P-3B	11.8	23.0
EC-121K	0	0	P-3C	17.4	34.5
C-130F	110.0	0	US-2A/B	0	0
C-1A	0	25.8	S-2E	0	0
C-2A	380.1	25.2	S-3A	54.2	20.3
E-1B	0	0	T-2C	0.1	6.5
E-2B	45.7	4.6	T-34	0	15.4
E-2C	278.1	179.2	OV-10	326.2	0
			AV-8A	10.8	241.6

VAMOSC Total 77 $312.5M
78 128.4M

22. REPLENISHMENT GROUND SUPPORT EQUIPMENT

22a. Definition - This is the cost of replacement of ground servicing equipment, maintenance and repair ship equipment, instruments and laboratory test equipment, and other miscellaneous items such as ground generators, jet engine test stands, test sets for radios, radars, and fire control systems, hand tools, compressors, and gauges. These equipment demands are generated by the need to replace common and peculiar support equipment that is worn out or destroyed.

22b. Discussion - Replacement peculiar ground support equipment (PGSE) for an aircraft system is budgeted by the aircraft program office and bought out of APN-7 funds. No distinction is made as to initial vs. replacement. Common GSE is budgeted by NAVAIR 534 and also funded by APN-7. These items are by nature not identifiable to a particular type/model/series aircraft. It is therefore extremely difficult to identify historical costs, as defined by the CAIG, for this element. A considerable effort would be required to obtain meaningful results.

22c. Cost-Estimating Relationship - This cost has been related to the flyaway cost of the aircraft.

$$RGSE = 0.0025FC_{100}$$

where,

RGSE = the annual cost of replenishment ground support equipment (FY78$K)

FC_{100} = the cumulative average flyaway cost of the first 100 production aircraft (FY78$K)

23. TRAINING ORDNANCE

23a. Definition - This is the cost of all conventional expendables used in non-combat flight operations of squadron aircraft for the purpose of keeping aircrews proficient in weapons delivery techniques. It includes the cost of sonobuoys, pyrotechnics, ballistic and guided weapons, as well as all conventional ordnance. Since many of these items, most notably the guided missiles, are considered weapon systems by themselves, it is easy to become confused regarding the definition of this element. An air-launched missile, for instance, has a complete set of O&S cost elements which are analyzed during its acquisition phase. None of them are to be included in this definition - only the procurement cost of the expended missile.

23b. Discussion - Costs for training ordnance using representative annual loads are contained in Exhibit III-6. These costs are obtained by escalating costs shown in Table C-8 of ASC R-120 by 6.8%.

23c. Cost-Estimating Relationship - No CER is given since training ordnance costs are not related to the physical characteristics or reliability and maintainability parameters which have been used throughout the model. The analyst must determine the weaponry installed or carried by the aircraft and then refer to Exhibit III-6 for representative annual unit costs.

EXHIBIT III-6

REPRESENTATIVE ANNUAL TRAINING ORDNANCE COST
(FY78$)

Ordnance	Unit Cost	Annual Cost Per Crew		
		Attack	Fighter	ASW
MK 76 PB	13	4,165	538	1,983
MK 106 PB	9	256	—	—
MK 82 LDGP	1,093	13,124	8,749	—
MK 82 INERT	559	7,593	12,150	—
MK 83 LDGP	1,930	1,930	—	—
MK 83 INERT	1,219	1,219	—	—
MK 45 PARAFLARES	213	4,614	4,614	—
CHAFF RR 129	2	374	250	—
MK 46 DECOY	25	197	246	—
M 55 TP	2	7,476	7,476	—
AIM-9L/M	48,060	—	24,030	—
AIM-7F	80,100	4,005	26,433	—
AMRAAM	90,780	—	—	—
MK 20 ROCKEYEII	3,776	3,776	—	—
MK 52/55	19,224	—	—	—
MK 82 LGB	5,340	21,360	—	—
AGM 45 SHR	29,904	14,952	—	—
WALLEYE I/II	74,760	—	—	—
AN/SSQ 41	184	—	—	14,655
AN/SSQ 53	532	—	—	15,971
AN/SSQ 50	515	—	—	20,608
SN/SSQ 62	738	—	—	22,154
AN/SSQ 47	515	—	—	20,608
AN/SSQ 36	166	—	—	1,660
		121,086	84,485	97,639

IV. SAMPLE RUNS FOR FY76, FY77 and FY78

This section provides some examples of the model's results - not only for the FY78 CER's contained in this report - but also for the FY76 and FY77 editions. Among other things, this comparison should provide insight into the stability of the equations over time, the accuracy of the supporting data, or the flux of operational concepts and/or the logistics support structure.

In order to accomplish this exercise, five hypothetical aircraft were created and run through each edition of the model. The five aircraft were as follows:

Heavy Fighter - an aircraft similar to the F-14A in reliability butheavier and slower;

Light Attack - an aircraft slightly heavier, slightly faster and slightly less reliable than the A-7E

Carrier-On-Board Delivery - an aircraft midway between the C-1A and C-2A in size, approximately equal in speed to the C-2A and in reliability to the C-1A

Light Weight Fighter - an aircraft similar in size but slower and less reliable than the F-18A.

Anti-Submarine Warfare - an aircraft larger, faster and less reliable than the S-3A.

The input variables for the five aircraft which are given in Exhibit IV-1 were held constant for each year except for the few instances where the

models required different inputs. The results are contained in Exhibits IV-2 through IV-16. Generally, the estimates were extremely consistent although the FY77 estimates appear to be low. The cause can be attributed to the Component Rework estimates and, further, to the Visibility and Management of Support Costs (VAMOSC) data on which they were based. The reader is left to make his own comparisons, but it should be pointed out that there are many reasons for the estimates to vary. First, the estimates are in different year dollars; secondly, the NARM indirect support methodology varies slightly from year to year. Thirdly, some methodologies differ from year to year and may not be exactly comparable.

Nevertheless, it is felt that the model runs provide good results which demonstrate the stability, sensitivity, and accuracy of the model.

EXHIBIT IV-1

INPUT FOR FIVE HYPOTHETICAL AIRCRAFT

Index	Description	HF	LA	COD	SWF	ASW
1	MPN Rate (Off.)	21.20	21.20	21.20	21.20	21.20
2	MPN Rate (Enl.)	9.20	9.20	9.20	9.20	9.20
3	Starting FY	1985.00	1985.00	1985.00	1985.00	1985.00
4	No. of Years	15.00	15.00	15.00	15.00	15.00
5	No. A/C per Year	40.00	40.00	40.00	40.00	40.00
6	Ground Officers	0.40	0.20	0.0	0.30	0.20
7	Off. Crew Allowance	2.75	1.30	2.20	1.50	4.50
8	Enl. Crew Allowance	0.0	0.0	1.10	0.0	1.50
9	Maint. MHR/MO	1155.00	625.00	720.00	750.00	1575.00
10	Flying HRS/MO	21.00	25.00	40.00	25.00	35.00
11	Air TAD (000$)	6.00	2.00	3.00	2.00	9.00
12	Gross Takeoff Wt.	65.00	35.00	40.00	31.00	58.00
13	Max. Speed (Alt.MPH)	1380.00	690.00	345.00	1208.00	518.00
14	Empty Wt. (000LBS)	36.00	14.00	22.00	12.00	36.00
15	Thrust/Eng(000LBS)	19.00	14.00	8.00	20.00	10.00
16	Time-B-OVHL (HRS)	1000.00	1000.00	1800.00	1000.00	1200.00
17	Engine Diameter	46.00	31.00	20.00	49.00	26.00
18	Eng. Type (0JET 1FAN)	1.00	0.0	0.0	1.00	1.00
19	No. of Engines	2.00	1.00	2.00	1.00	2.00
20	A/C RW Cycle (MOS)	34.00	40.00	60.00	28.00	40.00
21	Flyaway Cost (MIL)	26.00	9.00	6.00	17.00	30.00
22	TRNG. ORDN (Thous.)	0.0	0.0	0.0	0.0	0.0
23	A/C Type (1 2 3)	3.00	3.00	3.00	3.00	1.00

EXHIBIT IV-2

HF OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY78$)

12/14/80

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	1447	857954
DEPLOYED UNIT OPS	257	154379
AIRCREWS(OFFICERS)	61	36531
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	9	5314
POL	149	89463
OTHER DEPLOYED MPN	32	19472
AIR TAD	6	3600
BELOW-DEPOT MAINT	289	173653
A/C MAINT MPN	214	128349
MAINTENANCE MAT'L	71	42586
PERS SUP SUPPLIES	5	2718
INSTALLATIONS SUP	19	11460
BASE OPS SUPPORT	19	11460
O&M BASE OPS	14	8106
MPN BASE OPS	6	3354
DEPOT MAINTENANCE	353	202004
COMPONENT REWORK	108	65099
AIRFRAME REWORK	125	64975
ENGINE REWORK	120	71930
DEPOT SUPPLY	138	82712
DEPOT SUPPLY OPS	22	13226
TECHNICAL SUPPORT	116	69486
2ND DEST TRANS	51	30707
2ND DEST TRANS	51	30707
PERS SUP & TRAIN	108	64501
INDIVIDUAL TRAIN	45	26769
O&M	9	5390
MPN	36	21379
HEALTH CARE	24	14119
O&M	12	6976
MPN	12	7143
PERS ACTIVITIES	39	23612
O&M	2	1050
MPN	38	22562
SUS INVESTMENTS	231	138538
REPLEN SPARES	59	35578
MODIFICATIONS	107	63960
REPLEN GSE	65	39000
TRAINING ORDNANCE	0	0

EXHIBIT IV-3

HF OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	1265	750837
DEPLOYED UNIT OPS	244	146576
AIRCREWS(OFFICERS)	61	36531
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	9	5314
POL	136	81660
OTHER DEPLOYED MPN	32	19472
AIR TAD	6	3600
BELOW-DEPOT MAINT	289	173501
A/C MAINT MPN	214	128349
MAINTENANCE MAT'L	71	42443
PERS SUP SUPPLIES	5	2709
INSTALLATIONS SUP	19	11115
BASE OPS SUPPORT	19	11115
O&M BASE OPS	13	7761
MPN BASE OPS	6	3354
DEPOT MAINTENANCE	260	147912
COMPONENT REWORK	52	31391
AIRFRAME REWORK	102	53104
ENGINE REWORK	106	63417
DEPOT SUPPLY	98	58652
DEPOT SUPPLY OPS	19	11651
TECHNICAL SUPPORT	78	47001
2ND DEST TRANS	45	27051
2ND DEST TRANS	45	27051
PERS SUP & TRAIN	106	63506
INDIVIDUL TRAIN	44	26540
O&M	9	5161
MPN	36	21379
HEALTH CARE	23	13823
O&M	11	6679
MPN	12	7143
PERS ACTIVITIES	39	23144
O&M	2	1006
MPN	37	22138
SUS INVESTMENTS	204	122521
REPLEN SPARES	33	19562
MODIFICATIONS	107	63960
REPLEN GSE	65	39000
TRAINING ORDNANCE	0	0

EXHIBIT IV-4

HF

OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY76$)

	AVERAGE ANNUAL COST PER UE	FY85	FY86	FY87	FY88	FY89	FY90
AC PER YR		40.0	40.0	40.0	40.0	40.0	40.0
TOTAL	1364	47903	47903	51609	54542	54542	54542
O&M	700	21381	21381	25087	28020	28020	28020
MPN	404	16170	16170	16170	16170	16170	16170
APN	259	10352	10352	10352	10352	10352	10352
WPN	0	0	0	0	0	0	0
DEPLOYED UNIT OPS	227	9096	9096	9096	9096	9096	9096
AIRCREWS(OFFICERS)	58	2332	2332	2332	2332	2332	2332
AIRCREWS(ENLISTED)	0	0	0	0	0	0	0
COMBAT COMMAND STF	8	339	339	339	339	339	339
POL	123	4930	4930	4930	4930	4930	4930
OTHER DEPLOYED MPN	31	1255	1255	1255	1255	1255	1255
AIR TAD	6	240	240	240	240	240	240
BELOW-DEPOT MAINT	281	11225	11225	11225	11225	11225	11225
A/C MAINT MPN	207	8269	8269	8269	8269	8269	8269
MAINTENANCE MAT'L	69	2779	2779	2779	2779	2779	2779
PERS SUP SUPPLIES	4	177	177	177	177	177	177
INSTALLATIONS SUP	22	880	880	880	880	880	880
BASE OPS SUPPORT	22	880	880	880	880	880	880
O&M BASE OPS	13	538	538	538	538	538	538
MPN BASE OPS	9	342	342	342	342	342	342
DEPOT MAINTENANCE	314	5911	5911	9617	12550	12550	12550
COMPONENT REWORK	148	5911	5911	5911	5911	5911	5911
AIRFRAME REWORK	93	0	0	3705	3705	3705	3705
ENGINE REWORK	73	0	0	0	2933	2933	2933
DEPOT SUPPLY	106	4259	4259	4259	4259	4259	4259
DEPOT SUPPLY OPS	20	810	810	810	810	810	810
TECHNICAL SUPPORT	86	3449	3449	3449	3449	3449	3449
2ND DEST TRANS	44	1758	1758	1758	1758	1758	1758
2ND DEST TRANS	44	1758	1758	1758	1758	1758	1758
PERS SUP & TRAIN	111	4422	4422	4422	4422	4422	4422
INDIVIDUL TRAIN	46	1824	1824	1824	1824	1824	1824
O&M	7	266	266	266	266	266	266
MPN	39	1559	1559	1559	1559	1559	1559
HEALTH CARE	23	902	902	902	902	902	902
O&M	10	413	413	413	413	413	413
MPN	12	489	489	489	489	489	489
PERS ACTIVITIES	42	1696	1696	1696	1696	1696	1696
O&M	3	109	109	109	109	109	109
MPN	40	1587	1587	1587	1587	1587	1587
SUS INVESTMENTS	259	10352	10352	10352	10352	10352	10352
PEPLEN SPARES	87	3488	3488	3488	3488	3488	3488
MODIFICATIONS	107	4264	4264	4264	4264	4264	4264
PEPLEN GSE	65	2600	2600	2600	2600	2600	2600
TRAINING ORDNANCE	0	0	0	0	0	0	0

EXHIBIT IV-5

LA OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY78$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	672	397108
DEPLOYED UNIT OPS	129	77566
AIRCREWS(OFFICERS)	29	17269
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	4	2657
POL	71	42546
OTHER DEPLOYED MPN	23	13894
AIR TAD	2	1200
BELOW-DEPOT MAINT	170	102299
A/C MAINT MPN	123	73830
MAINTENANCE MAT'L	45	26761
PERS SUP SUPPLIES	3	1708
INSTALLATIONS SUP	11	6655
BASE OPS SUPPORT	11	6655
O&M BASE OPS	8	4707
MPN BASE OPS	3	1948
DEPOT MAINTENANCE	138	76693
COMPONENT REWORK	62	37165
AIRFRAME REWORK	49	23338
ENGINE REWORK	27	16189
DEPOT SUPPLY	54	32679
DEPOT SUPPLY OPS	11	6440
TECHNICAL SUPPORT	44	26239
2ND DEST TRANS	25	14951
2ND DEST TRANS	25	14951
PERS SUP & TRAIN	62	37037
INDIVIDUAL TRAIN	26	15431
O&M	5	3116
MPN	21	12314
HEALTH CARE	14	8199
O&M	7	4051
MPN	7	4148
PERS ACTIVITIES	22	13407
O&M	1	623
MPN	21	12784
SUS INVESTMENTS	82	49228
REPLEN SPARES	23	13588
MODIFICATIONS	37	22140
REPLEN GSE	23	13500
TRAINING ORDNANCE	0	0

EXHIBIT IV-6

LA OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	602	356671
DEPLOYED UNIT OPS	129	77576
AIRCREWS(OFFICERS)	29	17269
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	4	2657
POL	71	42555
OTHER DEPLOYED MPN	23	13894
AIR TAD	2	1200
BELOW-DEPOT MAINT	166	99871
A/C MAINT MPN	123	73830
MAINTENANCE MAT'L	41	24479
PERS SUP SUPPLIES	3	1562
INSTALLATIONS SUP	11	6455
BASE OPS SUPPORT	11	6455
O&M BASE OPS	8	4507
MPN BASE OPS	3	1948
DEPOT MAINTENANCE	95	52563
COMPONENT REWORK	35	21238
AIRFRAME REWORK	37	17955
ENGINE REWORK	22	13370
DEPOT SUPPLY	40	24002
DEPOT SUPPLY OPS	10	5752
TECHNICAL SUPPORT	30	18250
2ND DEST TRANS	22	13355
2ND DEST TRANS	22	13355
PERS SUP & TRAIN	61	36467
INDIVIDUL TRAIN	25	15298
O&M	5	2984
MPN	21	12314
HEALTH CARE	13	8027
O&M	6	3879
MPN	7	4148
PERS ACTIVITIES	22	13142
O&M	1	597
MPN	21	12545
SUS INVESTMENTS	77	46383
REPLEN SPARES	18	10743
MODIFICATIONS	37	22140
REPLEN GSE	23	13500
TRAINING ORDNANCE	0	0

EXHIBIT IV-7

LA

OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY76$)

	AVERAGE ANNUAL COST PER UE	FY85	FY86	FY87	FY88	FY89	FY90
AC PER YR		40.0	40.0	40.0	40.0	40.0	40.0
TOTAL	613	22149	22149	22149	24536	24536	24536
O&M	294	9364	9364	9364	11751	11751	11751
MPN	230	9202	9202	9202	9202	9202	9202
APN	90	3583	3583	3583	3583	3583	3583
WPN	0	0	0	0	0	0	0
DEPLOYED UNIT OPS	116	4656	4656	4656	4656	4656	4656
AIRCREWS(OFFICERS)	28	1102	1102	1102	1102	1102	1102
AIRCREWS(ENLISTED)	0	0	0	0	0	0	0
COMBAT COMMAND STF	4	170	170	170	170	170	170
POL	60	2409	2409	2409	2409	2409	2409
OTHER DEPLOYED MPN	22	895	895	895	895	895	895
AIR TAD	2	80	80	80	80	80	80
BELOW-DEPOT MAINT	154	6145	6145	6145	6145	6145	6145
A/C MAINT MPN	119	4757	4757	4757	4757	4757	4757
MAINTENANCE MAT'L	33	1305	1305	1305	1305	1305	1305
PERS SUP SUPPLIES	2	83	83	83	83	83	83
INSTALLATIONS SUP	13	511	511	511	511	511	511
BASE OPS SUPPORT	13	511	511	511	511	511	511
O&M BASE OPS	8	313	313	313	313	313	313
MPN BASE OPS	5	198	198	198	198	198	198
DEPOT MAINTENANCE	111	2047	2047	2047	4434	4434	4434
COMPONENT REWORK	51	2047	2047	2047	2047	2047	2047
AIRFRAME REWORK	39	0	0	0	1559	1559	1559
ENGINE REWORK	21	0	0	0	828	828	828
DEPOT SUPPLY	48	1920	1920	1920	1920	1920	1920
DEPOT SUPPLY OPS	9	376	376	376	376	376	376
TECHNICAL SUPPORT	39	1544	1544	1544	1544	1544	1544
2ND DEST TRANS	19	748	748	748	748	748	748
2ND DEST TRANS	19	748	748	748	748	748	748
PERS SUP & TRAIN	63	2539	2539	2539	2539	2539	2539
INDIVIDUL TRAIN	26	1053	1053	1053	1053	1053	1053
O&M	4	154	154	154	154	154	154
MPN	22	899	899	899	899	899	899
HEALTH CARE	13	524	524	524	524	524	524
O&M	6	240	240	240	240	240	240
MPN	7	284	284	284	284	284	284
PERS ACTIVITIES	24	962	962	962	962	962	962
O&M	2	65	65	65	65	65	65
MPN	22	897	897	897	897	897	897
SUS INVESTMENTS	90	3583	3583	3583	3583	3583	3583
REPLEN SPARES	30	1207	1207	1207	1207	1207	1207
MODIFICATIONS	37	1476	1476	1476	1476	1476	1476
REPLEN GSE	23	900	900	900	900	900	900
TRAINING ORDNANCE	0	0	0	0	0	0	0

EXHIBIT IV-8

OPERATING AND SUPPORT COST ESTIMATE

COD (Thousands of FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	718	425422
DEPLOYED UNIT OPS	155	92758
AIRCREWS(OFFICERS)	49	29225
AIRCREWS(ENLISTED)	10	6283
COMBAT COMMAND STF	0	0
POL	66	39626
OTHER DEPLOYED MPN	26	15824
AIR TAD	3	1800
BELOW-DEPOT MAINT	199	119440
A/C MAINT MPN	139	83602
MAINTENANCE MAT'L	56	33688
PERS SUP SUPPLIES	4	2150
INSTALLATIONS SUP	14	8174
BASE OPS SUPPORT	14	8174
O&M BASE OPS	10	5782
MPN BASE OPS	4	2393
DEPOT MAINTENANCE	135	75745
COMPONENT REWORK	77	46155
AIRFRAME REWORK	26	10525
ENGINE REWORK	32	19065
DEPOT SUPPLY	51	30671
DEPOT SUPPLY OPS	12	7185
TECHNICAL SUPPORT	39	23486
2ND DEST TRANS	28	16681
2ND DEST TRANS	28	16681
PERS SUP & TRAIN	77	45948
INDIVIDUAL TRAIN	32	19078
O&M	6	3843
MPN	25	15235
HEALTH CARE	17	10071
O&M	8	4976
MPN	8	5095
PERS ACTIVITIES	28	16799
O&M	1	751
MPN	27	16048
SUS INVESTMENTS	60	36003
REPLEN SPARES	20	12243
MODIFICATIONS	25	14760
REPLEN GSE	15	9000
TRAINING ORDNANCE	0	0

EXHIBIT IV-9

COD OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	664	394313
DEPLOYED UNIT OPS	158	94647
AIRCREWS(OFFICERS)	49	29225
AIRCREWS(ENLISTED)	10	6283
COMBAT COMMAND STF	0	0
POL	69	41515
OTHER DEPLOYED MPN	26	15824
AIR TAD	3	1800
BELOW-DEPOT MAINT	196	117687
A/C MAINT MPN	139	83602
MAINTENANCE MAT'L	53	32040
PERS SUP SUPPLIES	3	2045
INSTALLATIONS SUP	13	7929
BASE OPS SUPPORT	13	7929
O&M BASE OPS	9	5536
MPN BASE OPS	4	2393
DEPOT MAINTENANCE	99	55193
COMPONENT REWORK	47	27957
AIRFRAME REWORK	20	7922
ENGINE REWORK	32	19314
DEPOT SUPPLY	40	23881
DEPOT SUPPLY OPS	11	6649
TECHNICAL SUPPORT	29	17231
2ND DEST TRANS	26	15438
2ND DEST TRANS	26	15438
PERS SUP & TRAIN	75	45240
INDIVIDUL TRAIN	32	18915
O&M	6	3679
MPN	25	15235
HEALTH CARE	16	9860
O&M	8	4764
MPN	8	5095
PERS ACTIVITIES	27	16466
O&M	1	719
MPN	26	15747
SUS INVESTMENTS	57	34299
REPLEN SPARES	18	10539
MODIFICATIONS	25	14760
REPLEN GSE	15	9000
TRAINING ORDNANCE	0	0

EXHIBIT IV-10

COD

OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY76$)

	AVERAGE ANNUAL COST PER UE	FY85	FY86	FY87	FY88	FY89	FY90
AC PER YR		40.0	40.0	40.0	40.0	40.0	40.0
TOTAL	672	24943	24943	24943	25978	25978	26862
O&M	310	10499	10499	10499	11533	11533	12417
MPN	288	11508	11508	11508	11508	11508	11508
APN	73	2937	2937	2937	2937	2937	2937
WPN	0	0	0	0	0	0	0
DEPLOYED UNIT OPS	144	5774	5774	5774	5774	5774	5774
AIRCREWS(OFFICERS)	47	1866	1866	1866	1866	1866	1866
AIRCREWS(ENLISTED)	10	405	405	405	405	405	405
COMBAT COMMAND STF	0	0	0	0	0	0	0
POL	59	2364	2364	2364	2364	2364	2364
OTHER DEPLOYED MPN	25	1019	1019	1019	1019	1019	1019
AIR TAD	3	120	120	120	120	120	120
BELOW-DEPOT MAINT	185	7396	7396	7396	7396	7396	7396
A/C MAINT MPN	135	5386	5386	5386	5386	5386	5386
MAINTENANCE MAT'L	47	1890	1890	1890	1890	1890	1890
PERS SUP SUPPLIES	3	121	121	121	121	121	121
INSTALLATIONS SUP	16	628	628	628	628	628	628
BASE OPS SUPPORT	16	628	628	628	628	628	628
O&M BASE OPS	10	384	384	384	384	384	384
MPN BASE OPS	6	244	244	244	244	244	244
DEPOT MAINTENANCE	105	2293	2293	2293	3328	3328	4212
COMPONENT REWORK	57	2293	2293	2293	2293	2293	2293
AIRFRAME REWORK	22	0	0	0	0	0	884
ENGINE REWORK	26	0	0	0	1034	1034	1034
DEPOT SUPPLY	50	1993	1993	1993	1993	1993	1993
DEPOT SUPPLY OPS	11	429	429	429	429	429	429
TECHNICAL SUPPORT	39	1564	1564	1564	1564	1564	1564
2ND DEST TRANS	19	771	771	771	771	771	771
2ND DEST TRANS	19	771	771	771	771	771	771
PERS SUP & TRAIN	79	3150	3150	3150	3150	3150	3150
INDIVIDUL TRAIN	33	1300	1300	1300	1300	1300	1300
O&M	5	189	189	189	189	189	189
MPN	28	1111	1111	1111	1111	1111	1111
HEALTH CARE	16	643	643	643	643	643	643
O&M	7	295	295	295	295	295	295
MPN	9	349	349	349	349	349	349
PERS ACTIVITIES	30	1207	1207	1207	1207	1207	1207
O&M	2	78	78	78	78	78	78
MPN	28	1128	1128	1128	1128	1128	1128
SUS INVESTMENTS	73	2937	2937	2937	2937	2937	2937
REPLEN SPARES	34	1353	1353	1353	1353	1353	1353
MODIFICATIONS	25	984	984	984	984	984	984
REPLEN GSE	15	600	600	600	600	600	600
TRAINING ORDNANCE	0	0	0	0	0	0	0

EXHIBIT IV-11

LWF OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY78$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	958	568288
DEPLOYED UNIT OPS	176	105836
AIRCREWS(OFFICERS)	33	19926
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	7	3985
POL	109	65408
OTHER DEPLOYED MPN	26	15317
AIR TAD	2	1200
BELOW-DEPOT MAINT	215	129213
A/C MAINT MPN	144	86688
MAINTENANCE MAT'L	67	39973
PERS SUP SUPPLIES	4	2551
INSTALLATIONS SUP	13	7761
BASE OPS SUPPORT	13	7761
O&M BASE OPS	9	5489
MPN BASE OPS	4	2271
DEPOT MAINTENANCE	215	122442
COMPONENT REWORK	72	43068
AIRFRAME REWORK	79	40862
ENGINE REWORK	64	38513
DEPOT SUPPLY	87	52190
DEPOT SUPPLY OPS	15	8940
TECHNICAL SUPPORT	72	43250
2ND DEST TRANS	35	20755
2ND DEST TRANS	35	20755
PERS SUP & TRAIN	72	43254
INDIVIDUAL TRAIN	30	18012
O&M	6	3636
MPN	24	14375
HEALTH CARE	16	9561
O&M	8	4724
MPN	8	4837
PERS ACTIVITIES	26	15681
O&M	1	725
MPN	25	14956
SUS INVESTMENTS	145	86838
REPLEN SPARES	33	19518
MODIFICATIONS	70	41820
REPLEN GSE	43	25500
TRAINING ORDNANCE	0	0

EXHIBIT IV-12

LWF OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	903	534691
DEPLOYED UNIT OPS	173	103500
AIRCREWS(OFFICERS)	33	19926
AIRCREWS(ENLISTED)	0	0
COMBAT COMMAND STF	7	3985
POL	105	63072
OTHER DEPLOYED MPN	26	15316
AIR TAD	2	1200
BELOW-DEPOT MAINT	211	126612
A/C MAINT MPN	144	86688
MAINTENANCE MAT'L	63	37528
PERS SUP SUPPLIES	4	2395
INSTALLATIONS SUP	13	7527
BASE OPS SUPPORT	13	7527
O&M BASE OPS	9	5256
MPN BASE OPS	4	2271
DEPOT MAINTENANCE	184	103202
COMPONENT REWORK	40	23926
AIRFRAME REWORK	88	45751
ENGINE REWORK	56	33525
DEPOT SUPPLY	77	45979
DEPOT SUPPLY OPS	14	8362
TECHNICAL SUPPORT	63	37616
2ND DEST TRANS	32	19414
2ND DEST TRANS	32	19414
PERS SUP & TRAIN	71	42588
INDIVIDUL TRAIN	30	17857
O&M	6	3482
MPN	24	14375
HEALTH CARE	16	9360
O&M	8	4523
MPN	8	4837
PERS ACTIVITIES	26	15371
O&M	1	694
MPN	24	14677
SUS INVESTMENTS	143	85869
REPLEN SPARES	31	18549
MODIFICATIONS	70	41820
REPLEN GSE	43	25500
TRAINING ORDNANCE	0	0

EXHIBIT IV-13

OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY76$)

LWF

	AVERAGE ANNUAL COST PER UE	FY85	FY86	FY87	FY88	FY89	FY90
AC PER YR		40.0	40.0	40.0	40.0	40.0	40.0
TOTAL	868	29591	29591	32914	34717	34717	34717
O&M	451	12900	12900	16222	18026	18026	18026
MPN	269	10760	10760	10760	10760	10760	10760
APN	148	5931	5931	5931	5931	5931	5931
WPN	0	0	0	0	0	0	0
DEPLOYED UNIT OPS	154	6142	6142	6142	6142	6142	6142
AIRCREWS(OFFICERS)	32	1272	1272	1272	1272	1272	1272
AIRCREWS(ENLISTED)	0	0	0	0	0	0	0
COMBAT COMMAND STF	6	254	254	254	254	254	254
POL	89	3549	3549	3549	3549	3549	3549
OTHER DEPLOYED MPN	25	987	987	987	987	987	987
AIR TAD	2	80	80	80	80	80	80
BELOW-DEPOT MAINT	192	7671	7671	7671	7671	7671	7671
A/C MAINT MPN	140	5585	5585	5585	5585	5585	5585
MAINTENANCE MAT'L	49	1960	1960	1960	1960	1960	1960
PERS SUP SUPPLIES	3	125	125	125	125	125	125
INSTALLATIONS SUP	15	596	596	596	596	596	596
BASE OPS SUPPORT	15	596	596	596	596	596	596
O&M BASE OPS	9	365	365	365	365	365	365
MPN BASE OPS	6	231	231	231	231	231	231
DEPOT MAINTENANCE	189	2447	2447	5769	7573	7573	7573
COMPONENT REWORK	61	2447	2447	2447	2447	2447	2447
AIRFRAME REWORK	83	0	0	3323	3323	3323	3323
ENGINE REWORK	45	0	0	0	1804	1804	1804
DEPOT SUPPLY	69	2747	2747	2747	2747	2747	2747
DEPOT SUPPLY OPS	13	527	527	527	527	527	527
TECHNICAL SUPPORT	55	2220	2220	2220	2220	2220	2220
2ND DEST TRANS	27	1092	1092	1092	1092	1092	1092
2ND DEST TRANS	27	1092	1092	1092	1092	1092	1092
PERS SUP & TRAIN	74	2965	2965	2965	2965	2965	2965
INDIVIDUL TRAIN	31	1229	1229	1229	1229	1229	1229
O&M	4	180	180	180	180	180	180
MPN	26	1049	1049	1049	1049	1049	1049
HEALTH CARE	15	611	611	611	611	611	611
O&M	7	280	280	280	280	280	280
MPN	8	331	331	331	331	331	331
PERS ACTIVITIES	28	1125	1125	1125	1125	1125	1125
O&M	2	75	75	75	75	75	75
MPN	26	1050	1050	1050	1050	1050	1050
SUS INVESTMENTS	148	5931	5931	5931	5931	5931	5931
REPLEN SPARES	36	1443	1443	1443	1443	1443	1443
MODIFICATIONS	70	2788	2788	2788	2788	2788	2788
REPLEN GSE	43	1700	1700	1700	1700	1700	1700
TRAINING ORDNANCE	0	0	0	0	0	0	0

EXHIBIT IV-14

ASW OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY78$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	1609	955102
DEPLOYED UNIT OPS	266	159691
AIRCREWS(OFFICERS)	100	59778
AIRCREWS(ENLISTED)	14	8568
COMBAT COMMAND STF	4	2657
POL	99	59588
OTHER DEPLOYED MPN	40	23700
AIR TAD	9	5400
BELOW-DEPOT MAINT	384	230541
A/C MAINT MPN	286	171554
MAINTENANCE MAT'L	92	55448
PERS SUP SUPPLIES	6	3539
INSTALLATIONS SUP	27	15942
BASE OPS SUPPORT	27	15942
O&M BASE OPS	19	11276
MPN BASE OPS	8	4666
DEPOT MAINTENANCE	343	195098
COMPONENT REWORK	150	90058
AIRFRAME REWORK	88	42281
ENGINE REWORK	105	62759
DEPOT SUPPLY	125	74744
DEPOT SUPPLY OPS	24	14559
TECHNICAL SUPPORT	100	60184
2ND DEST TRANS	56	33802
2ND DEST TRANS	56	33802
PERS SUP & TRAIN	150	90134
INDIVIDUAL TRAIN	62	37350
O&M	13	7511
MPN	50	29838
HEALTH CARE	33	19642
O&M	16	9704
MPN	17	9937
PERS ACTIVITIES	55	33142
O&M	2	1449
MPN	53	31694
SUS INVESTMENTS	259	155151
REPLEN SPARES	61	36351
MODIFICATIONS	123	73800
REPLEN GSE	75	45000
TRAINING ORDNANCE	0	0

EXHIBIT IV-15

AIN OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY77$)

	AVERAGE ANNUAL COST PER UE	TOTAL COST 600 AC
TOTAL	1560	927128
DEPLOYED UNIT OPS	265	159244
AIRCREWS(OFFICERS)	100	59778
AIRCREWS(ENLISTED)	14	8568
COMBAT COMMAND STF	4	2657
POL	99	59141
OTHER DEPLOYED MPN	40	23700
AIR TAD	9	5400
BELOW-DEPOT MAINT	394	236694
A/C MAINT MPN	286	171553
MAINTENANCE MAT'L	102	61232
PERS SUP SUPPLIES	7	3908
INSTALLATIONS SUP	26	15463
BASE OPS SUPPORT	26	15463
O&M BASE OPS	18	10797
MPN BASE OPS	8	4666
DEPOT MAINTENANCE	331	189344
COMPONENT REWORK	148	88776
AIRFRAME REWORK	76	36563
ENGINE REWORK	107	64006
DEPOT SUPPLY	109	65561
DEPOT SUPPLY OPS	24	14523
TECHNICAL SUPPORT	85	51038
2ND DEST TRANS	56	33717
2ND DEST TRANS	56	33717
PERS SUP & TRAIN	148	88743
INDIVIDUL TRAIN	62	37030
O&M	12	7192
MPN	50	29838
HEALTH CARE	32	19229
O&M	15	9292
MPN	17	9937
PERS ACTIVITIES	54	32484
O&M	2	1387
MPN	52	31097
SUS INVESTMENTS	231	138360
REPLEN SPARES	33	19561
MODIFICATIONS	123	73800
REPLEN GSE	75	45000
TRAINING ORDNANCE	0	0

EXHIBIT IV-16

ASW OPERATING AND SUPPORT COST ESTIMATE
(THOUSANDS OF FY76$)

	AVERAGE ANNUAL COST PER UE	FY85	FY86	FY87	FY88	FY89	FY90
AC PER YR		40.0	40.0	40.0	40.0	40.0	40.0
TOTAL	1647	59916	59916	63008	65864	65864	65864
O&M	774	24998	24998	28091	30946	30946	30946
MPN	567	22677	22677	22677	22677	22677	22677
APN	306	12240	12240	12240	12240	12240	12240
WPN	0	0	0	0	0	0	0
DEPLOYED UNIT OPS	248	9928	9928	9928	9928	9928	9928
AIRCREWS(OFFICERS)	95	3816	3816	3816	3816	3816	3816
AIRCREWS(ENLISTED)	14	552	552	552	552	552	552
COMBAT COMMAND STF	4	170	170	170	170	170	170
POL	88	3503	3503	3503	3503	3503	3503
OTHER DEPLOYED MPN	38	1527	1527	1527	1527	1527	1527
AIR TAD	9	360	360	360	360	360	360
BELOW-DEPOT MAINT	397	15879	15879	15879	15879	15879	15879
A/C MAINT MPN	276	11052	11052	11052	11052	11052	11052
MAINTENANCE MAT'L	113	4537	4537	4537	4537	4537	4537
PERS SUP SUPPLIES	7	290	290	290	290	290	290
INSTALLATIONS SUP	31	1224	1224	1224	1224	1224	1224
BASE OPS SUPPORT	31	1224	1224	1224	1224	1224	1224
O&M BASE OPS	19	749	749	749	749	749	749
MPN BASE OPS	12	475	475	475	475	475	475
DEPOT MAINTENANCE	332	7323	7323	10415	13271	13271	13271
COMPONENT REWORK	183	7323	7323	7323	7323	7323	7323
AIRFRAME REWORK	71	0	0	0	2855	2855	2855
ENGINE REWORK	77	0	0	3092	3092	3092	3092
DEPOT SUPPLY	132	5277	5277	5277	5277	5277	5277
DEPOT SUPPLY OPS	24	963	963	963	963	963	963
TECHNICAL SUPPORT	108	4313	4313	4313	4313	4313	4313
2ND DEST TRANS	47	1865	1865	1865	1865	1865	1865
2ND DEST TRANS	47	1865	1865	1865	1865	1865	1865
PERS SUP & TRAIN	154	6180	6180	6180	6180	6180	6180
INDIVIDUL TRAIN	64	2544	2544	2544	2544	2544	2544
O&M	9	369	369	369	369	369	369
MPN	54	2175	2175	2175	2175	2175	2175
HEALTH CARE	31	1254	1254	1254	1254	1254	1254
O&M	14	575	575	575	575	575	575
MPN	17	679	679	679	679	679	679
PERS ACTIVITIES	60	2382	2382	2382	2382	2382	2382
O&M	4	151	151	151	151	151	151
MPN	56	2231	2231	2231	2231	2231	2231
SUS INVESTMENTS	306	12240	12240	12240	12240	12240	12240
REPLEN SPARES	108	4320	4320	4320	4320	4320	4320
MODIFICATIONS	123	4920	4920	4920	4920	4920	4920
REPLEN GSE	75	3000	3000	3000	3000	3000	3000
TRAINING ORDNANCE	0	0	0	0	0	0	0